EFFICIENCY2.0

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Public Hearing
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Public Comments on Raised Bill No. 6603 by Andy Frank, Representing Efficiency 2.0, LLC

Good afternoon and thank you for the opportunity to address the Energy & Technology Committee ("Committee"). My name is Andy Frank, Executive Vice President at Efficiency 2.0, an online software company born right here in Connecticut. I would like to support the inclusion of the residential sector in the Class III Renewable Portfolio Standard ("RPS"), as represented in Raised Bill No. 6603 "An Act Concerning the Class III RPS" and encourage the Committee to include further language that will **allow every residential ratepayer to participate in this market through behavior-based energy efficiency programs.**

I would also like to commend this body for passing many forward-looking policies that have made Connecticut a national leader in renewable energy and energy efficiency. My company is part of the EnergySmartCT campaign to reduce energy use 20% by 2020, and we would not be here today if it were not for the incredible work of this Committee, the Department of Public Utility Control ("DPUC"), the Connecticut Energy Efficiency Fund ("CEEF"), the Connecticut Clean Energy Fund ("CCEF") and other state energy bodies.

I encourage the Committee to maximize the benefits of the Class III RPS, including peak electricity reductions, lower ratepayer energy costs and the reduction of harmful pollutants, by including language that will allow Connecticut residential ratepayers to capture the value of the Class III RPS through programs that utilize behavior-based energy efficiency strategies. Behavior strategies can reduce much of the administrative burden of current residential energy efficiency programs and will provide direct incentives to ratepayers, which will not only reduce peak and total energy use, but will also stimulate the economy and reduce the utility burden of our most vulnerable. We estimate that behavior strategies as part of the EnergySmartCT campaign could provide $100 million in ratepayers benefits, both energy savings as well as incentives funded by the Class III RPS.

In addition to the direct economic benefits to residential ratepayers, behavior strategies must be an integral part of the state's energy efforts. Studies and program experience over many decades points strongly towards behavior as a key leverage point in any effective energy efficiency program; indeed, a forthcoming study from American Council for an Energy Efficiency Economy (ACEEE) estimates that behavior strategies could reduce energy use by 25% or more[1]. This "behavior" resource is not one that can be avoided if the state hopes to meet its peak reduction, energy efficiency and greenhouse gas goals.

[1] A recent American Council for an Energy Efficient Economy (ACEEE) study, "Behavior, Energy, and Climate Change: Policy Directions, Program Innovations, and Research Paths," estimates that the "behavioral resource" could reduce energy use by 25% or more.

However, the Committee should ensure that rigorous measurement and verification ("M&V") accompany any energy efficiency program that relies on behavior strategies. Specifically, I encourage the Committee to recommend that the DPUC encourage large-scale data analysis, which relies on billing data to calculate aggregate residential energy reductions. This form of M&V is recommended by the National Action Plan on Energy Efficiency ("NAPEE"), a body led by the US Environmental Protection Agency ("EPA") and Department of Energy ("DOE"), with participation from several Connecticut agencies: the DPUC, the Department of Environmental Protection ("DEP") and the Office of Consumer Counsel ("OCC"). Large-scale data analysis is a more verifiable approach because it utilizes actual billing data as opposed to "deemed savings" estimates of specific technologies that often have large potential for error despite the best efforts of evaluation professionals.

I encourage the Committee to include language regarding behavior-strategies in Raised Bill No. 6603 "An Act Concerning the Class III Renewable Portfolio Standard", as attached in my testimony as well as additional language, also attached, which supports the further development of the Class III RPS. Thank you very much for your time.

Testimony for the Record
RE: Behavior-Based Strategies and Large-Scale Data Analysis M&V

The traditional framework for thinking about energy efficiency is often referred to as the Physical-Technical-Economic Model (PTEM). This framework is based off of Everett Rogers's theory of "Diffusion of Innovations", first proposed in 1962, which contends that each individual must take several steps before accepting a new technology. Energy efficiency programs have thus aimed to accelerate technology uptake by providing information and incentives around new energy efficiency technologies.

The PTEM framework has been seriously questioned, however, as more and more research has demonstrated its inability to successfully explain technology uptake patterns and large variations in energy use between similar households (see Appendix 3 for a longer treatment of error and bias in the PTEM M&V approach, otherwise known as "deemed savings"). A recent American Council for an Energy Efficient Economy (ACEEE) paper by Karen Erhardt-Martinez, summarizes opinion on the subject[2]:

Evidence from several studies (Turrentine and Kurani 2007; Heffner et al. 2006, Kurani and Turrentine 2004, NRC 1984) indicates that the decision-making processes that are actually employed by individuals often differ dramatically from the assumed models of rationality. These studies raise numerous questions, for example: if participants aren't rationally assessing the costs and benefits of given technology choices, then what are the mechanisms by which change has been achieved, and how can we be sure of continued success? ... Some studies have successfully documented that the actual decision-making processes of individuals are much less systematic and logical than portrayed by traditional models of human behavior (Ariely 2008; Brafman and Brafman 2008, Thaler and Sunstein 2008; and Turrentine and Kurani 2007). Instead, they show that decision-making processes are likely to include a variety of non-economic concerns (Cialdini 2005) and that decisions are often bounded by contextual factors resulting in outcomes

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2 Erhardt-Martinez, Karen. 2008. *Behavior, Energy, and Climate Change: Policy Direction, Program Innovations, and Research Paths.* ACEEE Report E087. Washington D.C.: American Council for an Energy Efficiency Economy.

that are less than optimal (NRC 1984).

These findings comport with economic research that pegs the elasticity of energy use at around -0.6 (short run ~ -0.35 and long run ~ -0.85), implying that changes in energy costs currently have relatively little correlation to changes in energy usage[3]. Most program success in rebate programs can therefore be largely attributed to program marketing efforts, with price rebates playing a smaller part than generally estimated.

Instead of assuming that people are rational actors, therefore, other factors must be taken into account in successful program design. Chief among these other factors is social context. Erhardt-Martinez again summarizes the research[4]:

Numerous studies have found that people tend to "decide" on an "appropriate" course of action based on what other similar people do and what other people believe is the right thing to do. In other words, people glean information from their own observations and interactions with others as well as from the media and other sources of information as to how other people like them act in similar situations. People then use this information to discern a "socially rational" course of action.

Thus, behavior strategies can have a significant impact on energy usage. A study during the last energy crisis showed that when residents made public commitments to reduce their energy use by 20%, they actually reduced 15%, a very high rate compared to typical surveys documenting soft intentions versus actual impacts[5]. Similarly, a 2002 program in Canada, "The Way for Clean Air", documented 19% energy savings when program participants made public commitments[6].

As demonstrated by these studies and broader behavioral research, behavioral strategies offer enormous potential for savings. Ehardt-Martinez cites internal ACEEE estimates that behavioral change has the potential to reduce energy use by 25% or more, on par with estimates of savings from massive capital investment in technology. For example, the McKinsey Global Institute estimates that over $30 billion in capital investments would be needed to reduce residential energy use 30% assuming no behavioral change[7]. Behavior-based strategies are the lowest of the lowest-hanging fruit if they can be successfully implemented and measured.

This research suggests that distinctions between conservation and efficiency can be artificial. These two concepts are usually treated separately, with conservation implying reductions in utility, and efficiency implying reductions in usage for the same utility. Efficiency has traditionally been the goal of most demand reduction programs since it has been assumed that behavior changes through conservation are temporary, while installment of new technology will cause permanent, structural reductions. In fact, efficiency can often be the resource that produces

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[3] Espey, James A and Molly Espey. 2004. "Turning on the Lights: A Meta-Analysis of Residential Electricity Demand Elasticities." *Journal of Agricultural and Applied Economics*.

[4] Erhardt-Martinez, Karen. 2008. *Behavior, Energy, and Climate Change: Policy Direction, Program Innovations, and Research Paths.* ACEEE Report E087. Washington D.C.: American Council for an Energy Efficiency Economy.

[5] Becker, Lawrence J. 1978. "The Joint Effect of Feedback and Goal Setting on Performance: A Field Study of Residential Energy Consumption." *Journal of Applied Psychology* 63:428-433.

[6] Cullbridge Marketing and Communications. 2007. "20/20 The Way to Clean Air." www.toolsofchange.com/English/CaseStudies/default.asp?ID=188.

[7] Erhardt-Martinez, Karen. 2008. *Behavior, Energy, and Climate Change: Policy Direction, Program Innovations, and Research Paths.* ACEEE Report E087. Washington D.C.: American Council for an Energy Efficiency Economy.

temporary reductions while conservation behavior produces last reductions (see Appendix 3 for examples of how estimates of savings from technology can be highly variable). Energy usage is highly variable in countries and regions with similar standards of living (Japan vs. US, California vs. the South, etc.). The best strategy is therefore to pursue both conservation and efficiency at the same time, allowing each household to decide between changes in utility versus investments in structural change in the context of fulfilling a set goal.

Beyond good program design, however, the major challenge confronting behavior-based programs is the method used to measure and verify savings. This problem has vexed program administrators in the past. As Ehardt-Martinez puts it, "energy providers already know that behavior is having an impact on energy demand and energy savings, but *they often treat the impact as if it were zero* because they have insufficient information and evidence documenting the actual impacts"[8].

M&V is therefore a key barrier preventing wider application of behavioral strategies, including community marketing.

Large-scale data analysis offers a robust, verifiable approach to M&V in the context of residential behavior campaigns. Bill analysis, the most common form of large-scale data analysis, is often the preferred form of M&V when practicable. For example, the Connecticut Energy Conservation Management Board ("ECMB") put out M&V guidance for its Energy Efficiency Partners (EEP) program in a document entitled *Recommendations for Standards of Evidence and Department Review of Proposals* (Jan. 2008). The ECMB raises concerns about engineering models used for deemed savings estimates, preferring the actual measurement of savings: "savings from many projects do not match first-round engineering projections, [but] . . . measuring savings provides the feedback to help assure quality marketing, implementation and operation"[9]. This measurement can be in the form of real-time monitoring, submetering and/or bill analysis. Efficiency 2.0 has chosen to employ the latter option.

The International Performance Measurement and Verification Protocol (IPMVP), a respected standard often cited by the Department, ECMB and other Connecticut agencies, also recommends that billing analysis should be conducted in cases where a "multifaceted energy management program affect[s] many systems in a facility", corresponding to Option C[10].

More recently, the National Action Plan for Energy Efficiency (NAPEE), a consensus coalition led by the US DOE and EPA, and including several Connecticut state agencies[11], set out guidelines for measurement and verification in the context of different project types. In their document, *Model Energy Efficiency Program Impact Evaluation Guide*, the NAPEE recommends large-scale data analysis for "residential programs with relatively homogenous

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[8] Erhardt-Martinez, Karen. 2008. *Behavior, Energy, and Climate Change: Policy Direction, Program Innovations, and Research Paths.* ACEEE Report E087. Washington D.C.: American Council for an Energy Efficiency Economy.

[9] Energy Conservation Management Board (ECMB). 2008. "Recommendations for Standards of Evidence and Department Review of Proposals."

[10] Efficiency Valuation Organization. 2007. "International Performance Measurement and Verification Protocol."

[11] NAPEE included the Connecticut Office of Consumer Counsel, Connecticut Department of Environmental Protection, and the Connecticut Department of Public Utility Control as members of its public leadership group.

participants and measures, when project-specific analyses are not required or practical"[12]. Specifically, they recommend large-scale data analysis when:

Participation is well defined (i.e., the specific customers or facilities that participated in the program are known); the program has a relatively large number of participants (i.e., probably over 100); at least one year's worth of baseline energy consumption [is] available; there is some similarity between participants, or relatively homogenous subgroups of participants can be formed with similar facility and energy efficiency measure characteristics; expected changes in consumption due to measures installed through the program account for at least 10 percent of facility energy consumption.

Residential behavior-based programs that can track program participants, analyze relatively homogenous populations or sub-populations and track historical energy usage should therefore employ large-scale data analysis for M&V purposes.

But while large-scale data analysis is preferred in the context of residential behavior strategies, there are some challenges that need to be overcome in any program that employs this form of M&V. First, a sufficient sample size must be obtained to measure real effects as there can be large variations in energy use in any one building. Commercial and industrial facilities can get around this problem by providing information about their usage patterns. The transaction costs at getting this information from households is much higher, however. Therefore, a sufficiently large sample size is needed to verify the significance of changes in energy use.

There is ample precedent for the use of aggregate bill analysis for residential M&V. An example of billing analysis used in residential energy efficiency is a program conducted between 2001 and 2004, targeting low-income Vermonters living in single family homes[13]. The program revolves around an energy audit, in which an auditor visits the household, installs energy-saving devices, conducts an energy audit, and proposes other energy-saving measures to be installed at a later date. The energy measures were done at no cost to the program participants. The resulting data comes from utility records and program data detailing the various measures taken, resulting in a cross-sectional, time series (CSTS) data structure.

A second example is the Limited Income Refrigerator Replacement & Lighting program, carried out by San Diego Gas & Electric (SDG&E) Limited in 2004 and 2005[14]. Installers visited low- and limited income families and offered lighting measures, including the installation of up to 12 CFLs, ceiling fixtures, and halogen torchieres. The program also replaced refrigerators in the household if they meet a certain age criteria. A total of 2,005 household were involved, and a SAE model was used to analyze the data. Surveys were conducted in three phases to elicit information on free-ridership and program satisfaction.

More recently, in Sacramento, a program run by a company, Positive Energy, gave households targeted information on their energy use, comparing them to their peers and neighbors. Robust

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[12] National Action Plan for Energy Efficiency (NAPEE). 2007. *Model Energy Efficiency Program Impact Evaluation Guide*. Prepared by Steven R. Schiller, Schiller Consulting, Inc.

[13] Parlin, Kathryn and Larry Haugh. 2007. "Eliminating the Guesswork: The Information-Theoretic Approach to Model Selection." Chicago: Energy Program Evaluation Conference.

[14] Quantec, LLC. 2006. "A Measurement and Evaluation Study of the 2004-2005 Limited Income Refrigerator Replacement & Lighting Program." Prepared for San Diego Gas & Electric Company. Available at www.calmac.org.

statistical analysis of a control group that did not receive messages determined that there was in fact a significant effect from the messaging, which included bill information as well as targeted tips and information[15]. Positive Energy is running similar programs with over seven utilities across the country and has reduced aggregate energy use by a statistically significant 2% in early pilots. As EnergySmartCT utilizes actual volunteers, leverages Personal Energy Advisor[SM] software tools and grants personal and community incentives, Efficiency 2.0 expects to at least double these aggregate reductions[16].

In terms of actual statistical analysis, the NAPEE recommends either time-series comparisons that compare program participants' energy use before and after program participation, use of comparison groups that compare participants' energy use to non-participants, or preferably both[17].

Policy Proposals
RE: Clarification and Extension of the Class III RPS

Based on this testimony and that of Kerry O'Neill of Earth Markets, a partner of the EnergySmartCT campaign, I encourage the Committee to insert the following language into Raised Bill No. 6603, "An Act Concerning the Class III Renewable Portfolio Standard," which amends Public Act 07-242, "An Act Concerning Electricity and Energy Efficiency":

CLARIFICATION OF EXISTING LEGISLATION

1. Behavior as Energy Efficiency Resource, Large-Scale Data Analysis as Appropriate M&V

Purpose To acknowledge behavior as an important energy efficiency resource, recognizing that previous legislative and regulatory precedent on this issue is vague and uncertain, and including an appropriate and credible measurement & verification methodology in statute for determining energy and demand savings for the Class III RPS from any behavior-based efficiency and conservation efforts for residential ratepayers.

Comments Studies spanning three decades suggest that behavior strategies can have a large effect on energy use, both in the short and long-term,[18] and that residential consumers can reduce over 20 percent of their energy use through conservation measures if they set a goal, receive feedback, and are given concrete actions. Tracking actual energy and demand reductions through an aggregate bill analysis

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15 Kirsch, Jeremy. 2008. "Positive Energy, Inc.: Testimony Submitted to the PA PUC on 11/14/2008." Pennsylvania Public Utility Commission Docket No. M-00061884.

16 As previously noted, Efficiency 2.0 will ask for commitments to reduce much higher than 4%, but we expect many program participants will not make active efforts to reduce, lowering the aggregate savings percentages

17 National Action Plan for Energy Efficiency (NAPEE). 2007. *Model Energy Efficiency Program Impact Evaluation Guide.* Prepared by Steven R. Schiller, Schiller Consulting, Inc.

18 A recent American Council for an Energy Efficient Economy (ACEEE) study, "Behavior, Energy, and Climate Change: Policy Directions, Program Innovations, and Research Paths," estimates that the "behavioral resource" could reduce energy use by 25% or more.

methodology that is corrected for exogenous factors such as weather, can improve measurement & verification for residential projects, programs, or initiatives that use efficiency or conservation strategies that lead to behavior change. Numerous energy efficiency programs across the country, including the Sacramento Municipal Utility District, have utilized large-scale data analysis to measure and verify behavior-based programs, and there is growing academic, policy, and regulatory consensus that behavior is a key leverage point in reducing residential energy use. The National Action Plan on Energy Efficiency (NAPEE), a consensus document developed by the US EPA and DOE specifically, with the involvement of state agencies in Connecticut, [19] recommends large-scale data analysis in their "Model Energy Efficiency Program Evaluation Guide" for projects that involve a census of project sites, but do not necessarily rely on site-specific installation information.

Policy Change
Amendment to Section 42

b) [and] (3) include any other information that the department deems appropriate, <u>and (4) for programs that involve behavior-based strategies, provide historical electric utility bill information obtained with the permission of residential ratepayers, to perform large-scale data analyses, as referenced in the National Action Plan on Energy Efficiency "Model Energy Efficiency Program Evaluation Guide", that compare electricity usage before and after an energy efficiency or conservation measure has been implemented; specific measurement and verification plans that utilize large-scale data analyses must be overseen by third party professionals and approved by the Department of Public Utility Control.</u>

RPS Impact This policy would have a positive impact on the RPS by reducing Class III RPS compliance costs to all ratepayers as a result of increased market competition, increasing residential energy efficiency and conservation, and improving measurement & verification standards for residential programs and initiatives. The policy would also reduce or remove administrative burdens for ratepayers to execute their Class III property right, raising support for the RPS as a policy mechanism to meet climate change targets.

2. Conservation & Load Management Financed Residential Projects

Purpose To provide clarity and security that Conservation and Load Management (C&LM) Fund incentive programs for residential energy efficiency and conservation projects receive 100 percent of renewable energy credit value for their incentives.

Comments The Electric Distribution Companies (EDC's) presented a case in Docket No. 05-07-19RE01 that was supported by the DPUC (September 29, 2008) to allow for

[19] NAPEE included the Connecticut Office of Consumer Counsel, Connecticut Department of Environmental Protection, and the Connecticut Department of Public Utility Control as members of its public leadership group.

the remaining 25 percent of Class III RECs that are owned by the residential customer – from residential energy efficiency projects that receive C&LM funding – to be allocated to the C&LM fund for a total 100 percent of the value of the RECs. By including this regulatory decision into the statute, it will be clear to residential ratepayers that the value of Class III RECs is to be retained by the C&LM fund if the residential ratepayer receives incentives from the fund.

Policy Change
Amendment to Section 42

c) For conservation and load management projects that serve residential customers, [and] <u>receive Conservation and Load Management funding, and a minimum aggregation of 100 kW</u>, [seventy-five] <u>one-hundred</u> per cent of the financial value derived from the credits shall be directed to the Conservation and Load Management Funds.

RPS Impact This policy would not have a substantive impact on the RPS.

3. Privately Financed Residential Projects

Purpose To provide clarity and security that privately financed residential energy efficiency and conservation projects receive 100 percent of renewable energy credit value for their investments.

Comments Earth Markets presented a case in Docket No. 05-07-19RE01 that was supported by the DPUC (September 29, 2008) to allow independently funded residential energy efficiency projects to receive 100% of the financial value from the sale of RECs. By including this regulatory decision into the statute, investors can be assured that privately financed residential energy efficiency and conservation measures will continue to receive full economic value for their investments.

Policy Change
Amendment to Section 42

d) <u>For energy efficiency, conservation and load management projects that serve residential customers and that do not receive Conservation and Load Management funding, one-hundred percent of the financial value derived from the credits earned shall be directed to the residential customer who implements the efficiency, conservation or load management measure, or that residential customer's designated agent, pursuant to Sections 16-243t(a) and (b). The financial value derived from the credits earned by residential customer or their designated agent may be aggregated, with a minimum aggregation of 100 kW, pursuant to this section and Sections 16-243t(a) and (b).</u>

RPS Impact This policy would have a positive impact on the RPS by reducing Class III RPS compliance costs to all ratepayers as a result of increased market competition, increasing private sector investment in residential energy efficiency and conservation programs, and accelerating least-cost solutions and achieving better benefit to cost ratio energy efficiency and conservation programs.

4. Residential Ratepayer Inclusion in the Class III RPS

Purpose To clearly articulate in statute without any ambiguity that residential ratepayers can participate in the Class III RPS.

Comments The Class III RPS presents an opportunity to advance least-cost residential energy efficiency and conservation efforts in Connecticut. The statute is silent on whether or not Class III sources can come from the electricity savings created from residential ratepayers in this state. Clarifying the policy language will enable more private sector investment in residential energy efficiency and conservation.

Policy Change
Amendment to Section 44

Class III [renewable energy] source" means the electricity output from combined heat and power systems with an operating efficiency level of no less than fifty per cent that are part of customer-side distributed resources developed at commercial and industrial facilities in this state on or after January 1, 2006, a waste heat recovery system installed on or after April 1, 2007, that produces electrical or thermal energy by capturing preexisting waste heat or pressure from industrial or commercial processes, the electricity savings <u>created at commercial and industrial facilities, and by residential households</u> in this state from <u>efficiency,</u> conservation and load management programs, <u>supported by the ECMB or financed by other entities</u> begun on or after January 1, 2006.

RPS Impact This policy would first and foremost allow residential ratepayers an opportunity to participate in the Class III RPS. It would have a positive impact on the RPS by reducing compliance costs to all ratepayers as a result of increased market competition, increasing private sector investment in residential energy efficiency and conservation programs, and accelerating least-cost solutions and achieving better benefit to cost ratio energy efficiency and conservation programs.

Together, these policy proposals to clarify the Class III RPS will provide market certainty and transparency, allowing private investment in the residential energy efficiency market.

EXTENSTION OF CLASS III RPS

5. Extension of the Class III RPS

Purpose To reduce electricity usage in Connecticut by extending the Class III RPS beyond 4 percent by 2010 towards a target of 20 percent electricity reduced from 2005 levels by the year 2020.

Comments Encouraging energy efficiency and conservation by extending and expanding upon the Class III RPS will provide least-cost solutions to energy security and reliability, global warming, and economic growth and development. A target of 20 percent clean renewable energy and 20 percent energy efficiency by 2020 would be consistent with an initiative in the European Union that is intended to reduce greenhouse gas emissions by 20 percent.[20] The EnergySmartCT campaign is modeled after this goal to support clean energy and energy efficiency, while reducing greenhouse gas emissions.

Policy Change
Amendment to Section 43

(a) <u>Based on 2005 total electricity industry usage data provided by the Energy Information Agency for Connecticut, on</u> and after January 1, 2007, each electric distribution company providing standard service pursuant to section 16-244c, as amended by this act, and each electric supplier as defined in section 16-1, as amended by this act, shall demonstrate to the satisfaction of the Department of Public Utility Control that not less than one per cent of the total output of such supplier or such standard service of an electric distribution company shall be obtained from Class III [resources] sources. On and after January 1, 2008, not less than two per cent of the total output of any such supplier or such standard service of an electric distribution company shall, on demonstration satisfactory to the Department of Public Utility Control, be obtained from Class III [resources] sources. On or after January 1, 2009, not less than three per cent of the total output of any such supplier or such standard service of an electric distribution company shall, on demonstration satisfactory to the Department of Public Utility Control, be obtained from Class III [resources] sources. On and after January 1, 2010, not less than four per cent of the total output of any such supplier or such standard service of an electric distribution company shall, on demonstration satisfactory to the Department of Public Utility Control, be obtained from Class III [resources] sources. <u>On and after January 1, 2011, not less than six percent of the total output of any such supplier or such standard service of an electric distribution company shall, on demonstration satisfactory to the Department of Public Utility Control, be obtained from Class III [resources] sources. On and after January 1, 2012, not less than eight per cent of the total output of any such supplier or such standard service of an electric distribution company shall, on demonstration satisfactory to the Department of Public Utility Control, be obtained from Class III [resources] sources. On and after January 1, 2013, not less than ten per cent of</u>

[20] *Carbon Finance: Environmental Market Solutions to Climate Change* by Bryan Garcia and Eric Roberts of the Center for Business and the Environment at Yale. See Chapter 3 "A Pot of Gold for Renewable Energy? Funding Renewable Energy with Carbon Finance" by Peter Sweatman of Climate Change Capital (75).

the total output of any such supplier or such standard service of an electric distribution company shall, on demonstration satisfactory to the Department of Public Utility Control, be obtained from Class III [resources] sources. On and after January 1, 2014, not less than twelve per cent of the total output of any such supplier or such standard service of an electric distribution company shall, on demonstration satisfactory to the Department of Public Utility Control, be obtained from Class III [resources] sources. On and after January 1, 2015, not less than fourteen per cent of the total output of any such supplier or such standard service of an electric distribution company shall, on demonstration satisfactory to the Department of Public Utility Control, be obtained from Class III [resources] sources. On and after January 1, 2016, not less than sixteen per cent of the total output of any such supplier or such standard service of an electric distribution company shall, on demonstration satisfactory to the Department of Public Utility Control, be obtained from Class III [resources] sources. On and after January 1, 2017, not less than seventeen per cent of the total output of any such supplier or such standard service of an electric distribution company shall, on demonstration satisfactory to the Department of Public Utility Control, be obtained from Class III [resources] sources. On and after January 1, 2018, not less than eighteen per cent of the total output of any such supplier or such standard service of an electric distribution company shall, on demonstration satisfactory to the Department of Public Utility Control, be obtained from Class III [resources] sources. On and after January 1, 2019, not less than nineteen per cent of the total output of any such supplier or such standard service of an electric distribution company shall, on demonstration satisfactory to the Department of Public Utility Control, be obtained from Class III [resources] sources. On and after January 1, 2020, not less than twenty per cent of the total output of any such supplier or such standard service of an electric distribution company shall, on demonstration satisfactory to the Department of Public Utility Control, be obtained from Class III [resources] sources. Electric power obtained from customer-side distributed resources that does not meet air and water quality standards of the Department of Environmental Protection is not eligible for purposes of meeting the percentage standards in this section.

RPS Impact Establishing a base year for electric reductions is important otherwise how do you know whether or not you are improving. The year 2005 represents a reasonable base year from which the increase in the Class III RPS policy could be measured against. It also establishes a limit to the number of Class III RECs that can be registered and sold in any given year based on the 2005 electric usage data (see Figure 7).[21]

Table 1. Estimated Class III REC's Required per Year Based on 2005 Baseline

[21] The total electric usage in Connecticut for 2005 based on EIA data was 32,905,245 MWh.

Year	Class III RECs Required
2011	1,974,315
2012	2,632,420
2013	3,290,525
2014	3,948,629
2015	4,606,734
2016	5,264,839
2017	5,593,892
2018	5,922,944
2019	6,251,997
2020	6,581,049

An increase in the Class III RPS would result in greater ratepayer benefits than costs for the entire Class I and III RPS policies combined (see Figure 8).

For residential ratepayers paying for the RPS policies, the following would be the range of costs for Class III RPS compliance:

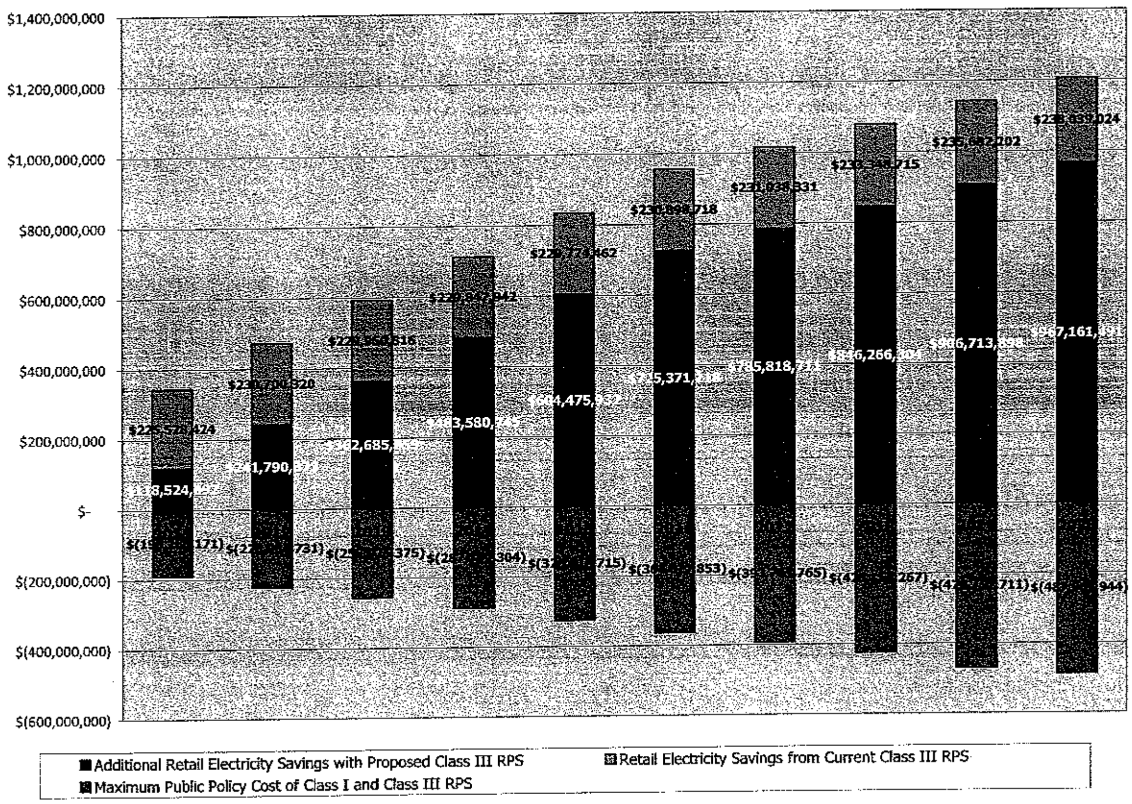
Table 2. Minimum (@$10 REC Price) and Maximum (@$31 REC Price) Public Policy Cost by Year or Residential Ratepayers for the Proposed Class III RPS Expansion[22]

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Minimum	$ 5.65	$ 7.69	$ 9.87	$ 12.14	$ 14.51	$ 16.91	$ 18.18	$ 19.26	$ 20.34	$ 21.42
Maximum	$ 17.53	$ 23.83	$ 30.60	$ 37.62	$ 44.99	$ 52.41	$ 56.35	$ 59.70	$ 63.05	$ 66.39

EnergySmartCT seeks to assist residential ratepayers save more energy than they are paying into the Class III RPS so as to directly benefit them from this market-based public policy.

[22] Assumes an annual average residential electricity usage of 8,400 kWh.

Figure 8. Class I and III RPS Benefits (Retail Electric Savings from Class III RPS) vs. Costs for Proposed Class III RPS Expansion



6. Competition in the Class III RPS

Purpose To encourage competition in the Class III RPS market.

Comments There are competitive issues with regards to the number of registered and sold RECs in the Class III RPS market. The CEEF has the potential to over-supply the market with RECs, which would result in less investment by the private sector and a continued reliance on ratepayer-supported funds instead of market-based mechanisms to provide energy and demand savings for Connecticut ratepayers. Private sector investors can achieve better benefit to cost ratios than the CEEF if the Class III RPS market were more competitive and transparent. Incentives for energy efficiency provided by the CEEF in combination with market-based private sector investment in the Class III RPS can create significant energy and demand savings for Connecticut ratepayers over and beyond current efforts.

Class III ESCs are being registered, exchanged and sold through the NEPOOL Generation Information System (GIS) – see Figure 8.

Despite the number of registered RECs (437,854) exceeding the estimated demand (316,640) for the Class III RPS in 2007, the price appeared to be near the DPUC-established ACP of $31. One would expect if the market for RECs is in surplus nearly 40%, or 121,214 RECs more than necessary, then the associated price would approach the floor price of $10, but this has not been the case. This market inconsistency presents market price risks for private sector investors interested in using the RPS to finance energy efficiency and conservation projects in Connecticut.

Figure 9. RECs Registered, Estimated Demand, and Price for Connecticut (2007 and 2008)

RECs	Q1	Q2	Q3	Q4	2007
Registered	209,431	49,078	58,655	120,690	437,854
Estimated Demand[23]	79,160	79,160	79,160	79,160	316,640
Surplus/(Deficit)	130,371	(30,082)	(20,505)	41,530	121,214
Market Prices[24]		$27.00			

RECs	Q1	Q2	Q3	Q4	2008
Registered	76,743	135,036	TBD	TBD	TBD
Estimated Demand[25]	160,185	160,185	160,185	160,185	640,740
Surplus/(Deficit)	(83,442)	(25,149)	TBD	TBD	TBD
Market Prices		$27.00	$26.75		

It should be noted that in 2007 the CEEF reported energy savings from their programs of 235,600 MWh and 119,900 MWh for commercial and industrial (C&I) and residential ratepayers, respectively. If all energy savings from the CEEF were to be registered as Class III RECs for 2007, then there would not be a private sector market for RECs in Connecticut given that supply of RECs by the CEEF of 355,400 would exceed the estimated demand from the Class III RPS of 316,640 by nearly 40,000 RECs – a supply of over 10 percent of the necessary demand.

Several questions that are important for the Connecticut General Assembly to answer are:

- Since the Class I, II and III RPS began, how many and what percentage of RECs have been registered and sold on behalf of residential ratepayers for energy efficiency and clean energy actions?

[23] Assumes the estimated annual electric demand for 2007 is based on the Connecticut Siting Council's "Review of the Ten Year Forecast of Connecticut Electric Loads and Resources" times the RPS target (1%) times 25% for each quarter.
[24] Market prices based on Evolution Markets monthly market update reports for that quarter.
[25] Assumes the estimated annual electric demand for 2007 is based on the Connecticut Siting Council's "Review of the Ten Year Forecast of Connecticut Electric Loads and Resources" times the RPS target (1%) times 25% for each quarter.

- Was the Class III RPS designed to provide more funding to the CEEF, to encourage additional private sector investment, or a combination of the two? Understanding the intent of the legislature to use market-based mechanisms to achieve additional energy and demand savings is important.

- What percentage of the Class III RPS in 2007 was satisfied by RECs registered and sold by the CEEF?

Policy Change
Amendment to Section 43

(b) Except as provided in subsection (d) of this section, the Department of Public Utility Control shall assess each electric supplier and each electric distribution company that fails to meet the percentage standards of subsection (a) of this section a charge of up to five and five-tenths cents for each kilowatt hour of electricity that such supplier or company is deficient in meeting such percentage standards. Seventy-five per cent of such assessed charges shall be deposited in the Energy Conservation and Load Management Fund established in section 16-245m, as amended by this act, and twenty-five per cent shall be deposited in the Renewable Energy Investment Fund established in section 16-245n, as amended by this act, except that such seventy-five per cent of assessed charges with respect to an electric supplier shall be divided among the Energy Conservation and Load Management Funds of electric distribution companies in proportion to the amount of electricity such electric supplier provides to end use customers in the state using the facilities of each electric distribution company. <u>Beginning in 2010, the Energy Conservation and Load Management Fund cannot register more than twenty-five percent of the annual Class III resource requirements to satisfy the RPS.</u>

RPS Impact By limiting the percentage of Class III RECs that can be registered and sold by the Connecticut Energy Efficiency Fund, then the private sector is encouraged to invest more resources in energy efficiency and conservation efforts in Connecticut. If the private sector is unable to meet the energy demand savings resulting from an increase in the RPS, then both the Connecticut Energy Efficiency Fund and the Connecticut Clean Energy Fund will receive alternative compliance payments for the shortage of Class III RECs met by the private sector and be able to invest those proceeds through their existing incentive programs.